



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/788,032	02/16/2001	Alexander Filatov	40002.4US01	3544

7590

01/29/2004

Homer L. Knearl, Esq.
Merchant & Gould P.C.
P.O. Box 2903
Minneapolis, MN 55402-0903

EXAMINER

LE, BRIAN Q

ART UNIT	PAPER NUMBER
----------	--------------

2623

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/788,032

Applicant(s)

FILATOV ET AL.

Examiner

Brian Q Le

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 February 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9-10. 6) ☐ Other: .

Art Unit: 2623

Claim Objections

1. Claim 2 is objected to because of the following informalities: The Examiner believes the term “phase” need to change to “phrase/phrases”. Appropriate correction is required.

Drawings

2. The drawing is of insufficient quality for publication (Note handwritten portions). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-6, 8-12, 14, and 16-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Plessis et al., “A multi-classifier combination strategy for the recognition of Handwritten Cursive Words”, Document Analysis and Recognition, 1993.

Regarding claim 1, Plessis teaches an apparatus for recognizing a string of characters of hand written text in an image loaded in a computing system (abstract), the apparatus comprising:

Holistic recognition means for recognizing the string of characters as a whole (page 462, 1st column, introduction, first 10 lines) and generating a first answer list (holistic filtered list)

Art Unit: 2623

(page 644, 1st column, last paragraph) and a segmentation list (page 462, 1st column, introduction, first 20 lines), the first answer list containing a plurality of recognition answers for the string of characters in the image each answer having a confidence value that the answer is correct, the segmentation list containing segmentation information separating the character features making up each character in the answer (Table 1 and page 644, 2nd column, Semi-parallel processing and word fusion);

Analytical recognition means (statistical/analytical method) responsive to the segmentation list for recognizing a plurality of characters individually and generating a second answer list (segmentation list) for the string of characters in the image each answer having a confidence value that the answer is correct (Table 1); and

Means responsive to the first answer list and the second answer list for finding the best recognition answer for the string of characters (FIG. 3 and page 643, 1st column, 1st paragraph).

Regarding claim 2, Plessis also teaches a computer system for processing information loaded as cursive text, a method for recognizing the cursive text to provide digital information corresponding to the cursive text. Please refer to claim 1 for further discussion. In addition, it is inherent that one skilled in the art would incorporate the concepts of loading image, constructing segmented image list, translating image to segmented features list and finding the best recognition base on both list to capture the image, to generate the segmented and holistic lists and to find the best recognition result from both holistic and analytical results. The Applicant is urged to consider the whole reference of Plessis to see the inherency of this discussion.

Regarding claim 3, please refer back to claims 1 and 2 for further discussion.

Art Unit: 2623

For claim 4, Plessis discloses the apparatus wherein the string of characters in a series of alphanumeric characters and spaces that make up a word, a sequence of words, one or more numbers, or a mix of words, alphabetic characters and numbers (different character representations) (Abstract, FIG. 1 and FIG. 2).

Referring to claim 5, Plessis teaches the apparatus wherein the means for finding comprises means for matching one or more recognition answers of the first answer list to one or more recognition answers of the second answer list to generate one or more matching answer pairs, each matching answer pair having a associated combined confidence value; and means for evaluating the combined confidence value associated with each matching answer pair to designate a matching answer pair having a highest combined confidence value as the best recognition answer (Table 1; Table 2; page 644, column 2 and page 645, top of column 1).

For claim 6, Plessis indicates the apparatus wherein the combined confidence value associated with each matching answer pair is defined by an average (normalize) of the confidence values of the recognition answer of the first answer list and the recognition answer of the second answer list of the matching answer pair (page 644, 2nd column, last 4 lines).

Regarding claim 8, Plessis teaches the apparatus wherein the means for finding comprises means for evaluating a highest confidence value of the first answer list and a highest confidence value of the second answer list against a probability algorithm to identify the best recognition answer for the string of characters (Table 1).

For claim 9, please refer back to claim 4 for further explanation.

For claim 10, please refer back to claim 1 for further explanation.

Regarding claim 11, please refer back to claim 6 and table 1 for further explanation.

Art Unit: 2623

Referring to claim 12, Please refer to the discuss of claim 1. In addition, Plessis teaches the matching of one or more possible answers (Lexicon/library of answers) to recognition list to generate matching answer (page 462, 2nd column, "Holistic word recognition" and page 463, 1st column, 1st paragraph).

Regarding claims 14 and 16, please refer to claim 1 for further explanation.

For claim 17, please refer back to claim 12 for the explanation.

Regarding claim 18, Plessis teaches the system wherein the answer module further comprise a selection module evaluating the combined confidence value for each matching answer pair to designate the matching answer pair having a highest combined confidence value as the word interpretation (Table 1 and Table 2).

For claim 19, please refer back to claim 7 for the explanation.

For claim 20, Plessis also discloses the system wherein the answer module receives the possible holistic word answer associated with a highest confidence value in the holistic answer list and the possible analytic word answer associated with a highest confidence value in the analytic answer list, the answer module further comprising a selection module evaluating the highest confidence values associated with the received possible holistic and analytic word answers against a probability algorithm and defining one of the possible holistic word answer and the possible analytic word answer as the word interpretation (Table 1 and table 2).

Regarding claim 21, Plessis teaches the system wherein the holistic recognition module comprises a segmentation module dividing the holistic word answer into a plurality of character feature sets, wherein each character feature set is associated with a character of the holistic word answer and divided into segmented features (page 462, 1st column), the system further

Art Unit: 2623

comprising a translate module locating the segmented features on the word image, filling the word image between segmented features and breaking the word image into the plurality of character images at one or more segmentation points defined between adjacent character feature sets (page 643, 1st column, "character segmentation").

Regarding claim 22, please refer to claim 1 for the explanation.

Regarding claim 23, please refer back to claims 1, 20 and 21 for the explanation.

Regarding claim 24, please refer back to claims 1, 20 and 21 for the explanation. Also, Plessis teaches the step of defining each character image (page 643, column 2).

Regarding claim 25, Plessis teaches the method wherein the designating operation comprises matching one or more possible holistic word answers to one or more analytic word answers to produce one or more matching answer pairs (please refer to claim 12 for the explanation); combining the confidence values of the possible holistic word answer and the possible analytic word answer in each matching answer pair to define a combined confidence value for each pair and selecting the matching answer pair having a highest combined confidence value as the interpretation of the handwritten word (page 644, 1st column, "Holistic driven recognition").

For claim 26, Plessis teaches the method wherein the operation of generating a holistic word answer further comprises dividing the holistic word answer into a plurality of character feature sets (page 642, 1st column, "Introduction"), each character feature set being associated with a character of the holistic word answer; and dividing each character feature set into a plurality of segmented features (page 643, 1st column, "Character segmentation").

Art Unit: 2623

Regarding claim 27, Plessis discloses the method further comprising locating the segmented features in the word image; filling the word image between the segmented features to define a string of connected character images; defining one or more hypothetical segmentation points between adjacent character feature sets on the string of connected character images; and breaking the string of connected character images into a plurality of character images at the hypothetical segmentation points (page 643, 1st column, “character segmentation”).

Also to claim 28, Plessis further discloses the method wherein the operation of generating an analytic word answer further comprises receiving the plurality of character images (abstract); recognizing each character image as being associated with a character; collecting one or more character variants associated with each of the plurality of character images; storing the character variants associated with each of the plurality of character images; comparing the character variants associated with each character image to a lexicon of words in a dictionary based on the character location associated with the character variant (storing into vector or lexicon) (page 643, 2nd column, “Recognition”); discarding each character variant that does not form a character in a word in the dictionary when placed in the word image at the character location associated with the character variant (matching step) (page 644, 1st column, “Holistic driven recognition”); and building the plurality of possible analytic word answers with the character variants that are associated with a word in the dictionary (FIG. 3 and page 643, 1st column, 1st paragraph).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2623

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Plessis et al., "A multi-classifier combination strategy for the recognition of Handwritten Cursive Words", Document Analysis and Recognition, 1993.

Regarding claim 7, Plessis teaches the apparatus wherein the means for finding comprises means for testing the highest combined confidence value against a next to highest combined confidence value to define an answer separation value (page 644, 1st column, "Holistic driven recognition"); and means for rejecting the matching word pair associated with the highest combined confidence value as the best recognition answer if the answer separation value is less than a predetermined threshold value. Further, Plessis indicates the teaching of maintaining a balance of combined confidence value between accepting choices between holistic or analytical methods with respect threshold hold (determine OK or BAD). Plessis further teaches that a word is not necessary selected even if it has a high confidence value in the holistic matching but its segmented confidence value (separation value) is BAD/low/small (less than threshold) (page 644, 1st column, "Holistic driven recognition"). Therefore, it would have been obvious for one skilled in the art to further elaborate Plessis's idea into a finer design choice for rejecting the matching word associated with the highest combined confidence value as the best recognition answer if the answer separation value is less than a predetermined threshold value to increase the recognition rate.

For claim 13, please refer back to claim 7 for the explanation.

Regarding claim 15, please refer back to claim 1 and claim 7 for the explanation.

CONCLUSION

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to character recognition and holistic analysis in general:

U.S. Pat. No. 5,455,872 to Bradley, teaches system and method for enhanced character recognition accuracy by adaptive probability weighting.

U.S. Pat. No. 5,287,275 to Kimura, teaches image recognition apparatus and method for recognizing a pattern within an image.

U.S. Pat. No. 5,832,108 to Fukita, teaches pattern recognition method using a network and system.

U.S. Pat. No. 5,144,683 to Suzuki, teaches a character recognition method.

U.S. Pat. No. 6,041,141 to Yamamoto, teaches character recognition machine utilizing language processing.

U.S. Pat. No. 5,987,170 to Yamamoto, teaches character recognition machine utilizing language processing.

Chin et al. "Empirical design of a holistic verifier for automatic sorting of handwritten Singapore Postal Addresses", Document Analysis and Recognition, 1999, pages 733-736.

Casey et al. "A survey of methods and strategies in character segmentation", Pattern Analysis and Machine Intelligence, IEEE, 1996, pages 690-706.

Sherkat et al. "Whole word recognition in facsimile images", Document Analysis and Recognition, 1999, pages 547-550.

Art Unit: 2623


Madhvanath et al. "The role of holistic paradigms in handwritten word recognition", Pattern Analysis and Machine Intelligence, 2001, pages 149-164.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q Le whose telephone number is 703-305-5083. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC Customer Service whose telephone number is 703-306-0377.

BL
January 14, 2004



**SAMIR AHMED
PRIMARY EXAMINER**